

The Vikings and Baron Dupuytren's disease

ADRIAN E. FLATT, MD

Dupuytren's disease (DD) is an ancient affliction of unknown origin. It is defined by Dorland as shortening, thickening, and fibrosis of the palmar fascia producing a flexion deformity of a finger. Tradition has it that the disease originated with the Vikings, who spread it throughout Northern Europe and beyond as they traveled and intermarried. After being present for hundreds of years, DD was named in the 19th century after a famous French surgeon, who was not the first to describe it. This article reviews the history of DD and describes its incidence, clinical manifestations, and treatment.

THE VIKINGS

In the year 865, "a great heathen army" of Vikings landed on England's east coast; an earlier raid on the monastery of Lindisfarne prompted a cleric of the times to say, "Never before has such terror appeared in Britain as we have now suffered from a pagan race." By the 10th century, 3 of England's 4 kingdoms were dominated by the Vikings, who gradually converted to Christianity and settled in the conquered territories (1).

The Viking age of exploration, trading, and colonization lasted nearly 300 years. They raided as far as Newfoundland to the west, the Mediterranean and its many ports to the south, and the Caspian Sea—by way of the rivers of Eastern Europe, such as the Volga and Dneiper—to the east.

The areas bordering the North Sea were significantly colonized, with Scotland, Ireland, England, France, Holland, and Belgium being principally involved. Vikings were present in Scotland for nearly 500 years. They left behind many Scandinavian family and place names that replaced the original Gaelic. They also left behind DD, which has persisted in some areas to this day; in Scotland, for example, since the 15th century the flexed fingers of adult male bagpipers have been known as "the curse of the MacCrimmons." In England, the Vikings who settled in the area of East Anglia became farmers, and to this day surnames derived from Scandinavian roots are common. My family name referred to those who settled on the flat lands of East Anglia. Like the Vikings, Flatt children were born with ash-blond hair, and many were blue eyed. This held true until ships of the Spanish Armada wrecked off the English coast in 1598. Survivors swam ashore and joined the local farmers; as a result, subsequent Flatt children were blond at birth but had jet-black hair by their teenaged years—as did I. The Flatts must have had strong genes, since neither my father nor I have had DD despite our Viking roots.

INCIDENCE OF DD BY ANCESTRY

In his 1963 book, the Australian hand surgeon John Hueston wrote, "Dupuytren's contracture is virtually confined to people of European descent" (2). Its highest incidence is recorded in Iceland. As expected, the incidence is also high in Scandinavia: In a Norwegian study of 15,950 citizens, DD was present in 10.5% of men and in 3.2% of women (3). In a large 1962 review of published figures, P. F. Early arrayed the countries of European stock in order of incidence of DD: Denmark, Australia, New Zealand, Canada, United Kingdom, Germany, and the United States. He also commented that the incidence in Australia, Canada, England, and Wales was similar since their populations are of basically English stock, which may itself represent a diluted strain of Danish (Viking) stock (4). The incidence in Sweden is matched in Edinburg. Two different studies by James and Ling in Scotland showed such a high family incidence that DD was described as inherited through a single autosomal-dominant gene of variable penetrance (5, 6).

In a study in the French port of Toulon, 60% of the general population had brown eyes and 40% had blue eyes, but 80% of inhabitants with DD had blue eyes. The latter individuals were traced to the families of Breton and Norman sailors in the city's history (7).

DD is relatively uncommon in Spain, Greece, and Italy, except for Greece and Italy's northern Adriatic Coast, which was penetrated by a northern genetic invasion during the Austro-Hungarian Empire.

In 1985, Robert McFarlane of Canada published a preliminary report of the activities of the committee on DD of the International Federation of Societies for Surgery of the Hand. In 812 patients, the family origin was Northern European in 68%, Southern European in 3%, black African and American Indian in 0.2%, Chinese in 2%, and Japanese in 16%. Northern European ancestry can hardly apply to Japan, where DD appears to be a different condition, in that 95% of cases occur in men and only 6% of cases occur in families with a history of DD—compared with 26% in other countries. I understand that an update of this massive study will be published shortly (8).

From the George Truett James Orthopaedics Institute, Baylor University Medical Center, Dallas, Texas.

Corresponding author: Adrian E. Flatt, MD, George Truett James Orthopaedics Institute, Baylor University Medical Center, 3500 Gaston Avenue, Dallas, Texas 75246.



Figure 1. The Baron Guillaume Dupuytren (1777–1835).

More recently, Hueston has modified his earlier views. He now states that an autosomal-dominant trait “explains a little of the etiology of DD,” but that much work remains to explain “the clear-cut preference for races of Northern European origin” (9). Quoting his own experience of “often seeing 40 cases of DD each week in consultation in Melbourne,” he comments: “DD may now be claimed by enthusiasts to have penetrated all five major races of the world. But what is the significance of these reports of infinitesimal incidence in such enormously populous races? Some interpret this wide occurrence as denying a European genetic origin. However, these reports of an exotic case or two in populations of hundreds of millions can scarcely be taken seriously” (9).

EARLY HISTORY

Greek and Roman literature contain no record of anything resembling DD. The Icelandic sagas of the 12th and 13th centuries describe a number of “miracle cures” recently discussed by Whaley and Elliot (10). Four cases are considered in detail, two of which could well have been DD. Whaley and Elliot found no evidence of DD in early Anglo-Saxon and Gaelic medical literature. In addition, the more extensive medical literature of medieval Europe before 1614 shows no evidence of the condition (11).

On December 5, 1831, Baron Guillaume Dupuytren delivered a lecture on permanent retractions of the flexed fingers which was published under the title “Leçon sur la rétraction permanente des doigts.” To this day, the condition bears his name, despite the fact that history shows that Felix Platter in 1680, Henry Cline, Jr., of St. Thomas’ Hospital in 1808, and Sir Astley Cooper in 1818 had already described a similar condition, with Cline specifically noting the involvement of the palmar fascia. Cooper and Dupuytren knew each other and communicated on several occasions before Dupuytren’s famous lecture in December 1831.

THE BARON GUILLAUME DUPUYTREN

Born in 1777, Guillaume Dupuytren was generally acknowledged as the greatest French surgeon of the 19th century; the English journal, *The Lancet*, named him in his lifetime “the most erudite and accomplished surgeon in Europe.” An ambitious man, he came from relatively humble origins and in his later years was created baron by Louis XVIII. He would now be called a draft dodger since his colleagues on the faculty of medicine in Paris arranged his deferment from the draft for Napoleon’s armies. In a fiercely competitive system, he rose in 20 years from a prosecutor of anatomy to chief surgeon of the Hôtel de Dieu in Paris (Figure 1).

Oliver Wendell Holmes described Dupuytren as “a square solid man with a high domed head, oracular in his utterance, indifferent to those around him, sometimes, it is said, very rough with them.” Critical of all those about him, he had few friends among his medical colleagues. Considerable adverse comments are recorded by his contemporaries: he was called “the greatest of surgeons, the meanest of men”; it was noted, “With absolute faith in his own abilities he made work his religion”; and his colleague stated, “If I could have avoided speaking of M. Dupuytren, it would have been a great relief to me, for I find myself in a very great embarrassment. I am almost sure to have all parties dissatisfied” (12).

Dupuytren’s name has been applied as an eponym to at least 12 diseases, fractures, operations, and instruments. He hated to write, and all his “literature” was recorded and published by his students in the local medical journals as “Leçons orales de clinique chirurgicale de Dupuytren.” For his time, he had a scientific and inquiring mind and was a caring physician who visited his patients every day. On ward rounds, he dressed distinctively in a green coat, white vest, blue trousers, and a small green cloth cap, which he had designed himself. The picture of this domineering, all-confident surgeon was marred by his almost constant “nervous habit of gnawing the nails of his left thumb and index finger” (13). His assistants were in awe of him. He has been described as “plying his whip unceasingly on the backs of his jaded horses,” a description that could apply to some clinical rounds in this 21st century. Dupuytren developed pleurisy at the age of 68 and died while his colleagues debated whether to drain the empyema, no doubt influenced by Dupuytren’s opinion that “it is better to die of the disease than of the operation” (14).

CLINICAL CONDITION

DD usually presents with a palmar nodule on the line of the ring or small finger (Figure 2). One hand, not necessarily the dominant, is affected first and later the other may show the characteristic nodule and finger contracture. The metacarpophalangeal joint is usually involved first and later the proximal interphalangeal joint.

DD is usually painless at onset and insidious in its progress. However, I am constantly amazed at how patients will tolerate significant degrees of contracture and appear for advice only when they start to poke themselves in the eye when washing their face. Erik Moberg of Sweden contends that men are frequently sent for treatment by their wives, who are bothered by the clawlike manipulation with the hand.



Figure 2. An early nodular involvement on the line of the ring finger.

A multitude of causes have been suggested for DD, but only heredity has general acceptance. Despite positive family histories, however, about 30% of cases are sporadic.

DD is relatively rare, occurring in 1% to 2% of the population. The disease is more common in men; the incidence in women is approximately 15% of those requiring surgical care but becomes higher in those who require nonsurgical treatment. There is a progressive rise in incidence with age. DD usually occurs in the fifth, sixth, and seventh decades; the peak age in men is 40 to 59, and in women, 40 to 69. The expression of the disease gene is almost complete in men over the age of 75 but is of much lower penetrance in women, unless it arises from both parents. In those with family histories of DD, the onset occurs earlier and leads to more marked contractures.

DUPUYTREN'S DIATHESIS

In a group of patients, DD presents more aggressively. Hueston has named this more aggressive form Dupuytren's diathesis. (Diathesis is the variable penetration of an autosomal-dominant gene.) In these patients, there is an early onset of disease, a positive family history, bilaterality, and involvement of areas other than the hand. When data from 736 international patients were reviewed, researchers found that when all factors contributing to the diathesis were present, the rate of recurrence or extension was 78%, whereas when all factors were absent, the rate was only 17% (Figure 3).

Dupuytren's diathesis is present in every member of a family but may show varying degrees in different members. However, each family member is "born to get it." This constitutional tendency for the onset of DD in the hands is closely related to tissue depositions elsewhere.

The "strength" of the diathesis varies. When low, there are no clinical signs of DD. When high, early recurrence may require radical secondary surgery. Clinical grading of this diathesis is an inexact science and requires great experience in diagnosis and treatment selection on the part of the surgeon.

Hueston records seeing a case of proven Dupuytren's contracture in a 12-year-old boy. A similar-aged boy was sent to me for leg amputation because of a mass on the sole of his foot. Based on a biopsy, sarcoma had been diagnosed. (Pathologists who are not told of a physical examination or a family history often are forced to suggest fibrosarcoma because of the cellular activity seen in the slide.) The boy's hands showed no real involvement, but his father and grandfather both showed marked bilateral involvement. I did not amputate his leg, and the boy was alive and well a number of years later.

ASSOCIATED CONDITIONS

A great variety of conditions have been associated with DD. Some are tenuous relationships; others are more marked. It is

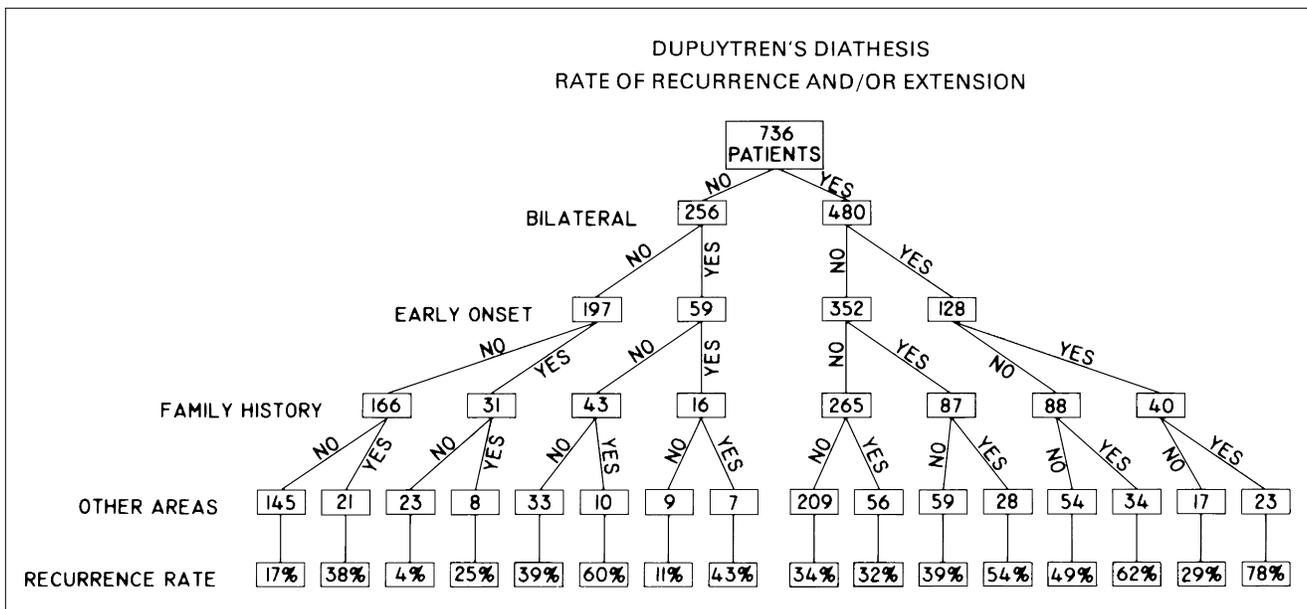


Figure 3. The rate of extension and/or recurrence in Dupuytren's diathesis. When all factors are present, the extension or recurrence rate is 78%, but when all factors are absent, the rate is only 17%. Reprinted with permission from McFarlane RM. Some observations on the epidemiology of Dupuytren's disease. In Hueston JT, Tubiana R, eds. *Dupuytren's Disease*. London: Churchill Livingstone, 1985:123.



Figure 4. Knuckle pads over the proximal interphalangeal joints of the fingers.

generally conceded that individuals with diabetes, epilepsy, chronic alcoholism, and pulmonary tuberculosis have an increased incidence and earlier onset of DD. However, Fisk has pointed out that no variety of disease, injury, activity, or occupation could induce DD in someone who was not genetically so determined (15).

Among other medical conditions that have been said to be associated with DD are arthritis, diabetes mellitus, myocardial disease, reflex sympathetic dystrophy, hepatic disease, alcoholism, barbiturate ingestion, peptic ulcers, fibromatosis, compulsive personality, carpal tunnel syndrome, trigger fingers, HIV, and smoking (16). DD is essentially a condition of middle and later ages, and its association with many common and chronic diseases is probably more coincidental than causative.

Fibromatosis

In DD, fibromatosis can occur in areas other than the palm and fingers. The most common site is as knuckle pads, followed by the sole of the foot. Peyronie's disease (penile deposits) is not common but is, in fact, associated with DD. Histological and biochemical studies show these tissues to be identical to those in the palm and digits.

Knuckle pads

When looking at the dorsum of one's proximal interphalangeal finger joints, the skin is seen to be wrinkled in full joint extension. The pattern of wrinkles varies in each individual but will disappear on full flexion of the joint. Normally the skin over the joint is not tethered. In some patients, the skin over the joints thickens into nodules, which often are tethered to deeper structures (Figure 4). These nodules are usually free of pain and rarely noticed by the patient. Occasional burning pain has been reported, and they are tender when knocked.

These nodules are said to be present in >80% of patients with DD; observation over time shows that they may develop, regress, or show little change. Knuckle changes can be present even before the palmar disease causes finger contractures. They are considered a warning sign that the patient may be prone to developing the typical palmar signs. McIndoe was so certain of this predisposition that he stated, "The clinician who observes a patient to have knuckle pads may be quite sure that the patient either has a Dupuytren's contracture or that one will de-

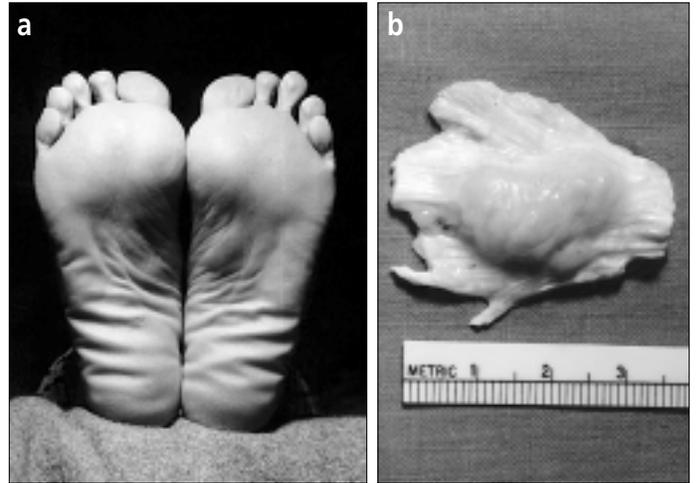


Figure 5. (a) Dupuytren's involvement of the sole of the foot. (b) The involvement arises within the plantar fascia. It need only be removed if discomfort hinders walking.

velop in the future" (17). This is particularly likely in patients subject to Dupuytren's diathesis.

Plantar nodules

Involvement of the sole of the foot frequently presents on the medial border of the sole near the highest point of the arch (Figure 5). The lump is painless; it is fixed within the plantar aponeurosis while the overlying skin is freely movable. Contracture of the toes does not occur. Hueston reported that in 224 patients, 20% had plantar nodules, but when the nodule was associated with recurrence or extension of the disease, the incidence rose to 75%. The biopsy is predominantly cellular and frequently misdiagnosed as fibrosarcoma. These plantar nodules occur most commonly in patients with epilepsy.

Epilepsy

In Sweden, Skoog examined the hands of 207 patients with epilepsy and found that 42% had palmar involvement, 26% had knuckle pads, and 8% had plantar involvement (18). He suggested that the use of barbiturates was associated with the occurrence of DD. But Thieme compared 351 patients with epilepsy who had DD with 408 controls and found that in those with a history of barbiturate intake the number of patients with or without DD was identical. Even in patients who had taken barbiturates for >5 years, there was no significant difference between the 2 groups (19).

Diabetes

The association between diabetes and DD is well known, but the DD contractures are usually mild and curiously affect the long and ring fingers most frequently; the small finger is rarely affected. Some physicians believe that early contractures should be considered a warning sign of diabetes development. The association is almost always with non-insulin-dependent diabetes, but cases associated with insulin-dependent diabetes have been reported (20). Some suggest that the pattern of inheritance predisposes patients to both DD and diabetes mellitus. The true incidence of DD in proven diabetes probably approaches 40%, but it has been variously quoted as varying between 1.6% and 32%.

HIV

In the United Kingdom, the prevalence of DD is about 5.5%, but in 50 patients with HIV, it was found to be 36%. According to one theory, DD may be caused by oxidation by free radicals, and it is known that an increase in the production of free radicals occurs in HIV (21).

Trauma and occupational stresses

One of the etiological factors always proposed in DD is trauma to the hand—particularly repeated blows to the palm. An isolated injury to the palm may cause a reaction hard to distinguish from DD, but the injury itself is not the prime cause; more often than not, the injury draws attention to the palmar lesion or a contracture of a finger that had previously been ignored.

Occupational stresses have long been associated with DD. Dupuytren's second DD patient was a coachman with involvement of the ring and small fingers of his whip hand. These fingers, used in the power grip, are most frequently involved in all patients, and yet many of them have sedentary occupations. Several papers reported a high incidence of DD in brewery workers, but later views associated the contractures with the known association of alcoholism with DD. Hueston personally studied the hands of 551 clerical workers and 1154 laborers who included 530 brewery workers and found no difference in the incidence of DD among these groups (22).

In 1912, a government committee in Great Britain found no conclusive connection between trauma, occupations, and Dupuytren's contracture. This view is supported by many recent studies in other countries, particularly Australia and Scotland. In some Eastern European countries, DD is still classified as an industrial disease, but it appears that the reasons for acceptance or rejection of a claim in the various jurisdictions vary from case to case and are not necessarily based on current knowledge (23).

In the USA in general, administrative law judges, carriers, and claimants' attorneys consistently do not relate DD to work activities or injury. However, the law says that when "symptoms" arise at work in the presence of an "underlying but unrelated condition," then these symptoms become entirely proportionally compensable with respect to medical care and work law. English common law says employment of an individual with a predisposition to any condition does not absolve the employer of the responsibility for the effects of the condition if these are brought on during the course of that individual's employment.

NONOPERATIVE TREATMENT

Many nonsurgical treatments of DD have been tried—radiation, dimethyl sulfoxide, vitamin E cream, ultrasound, physical therapy, steroids, interferon, and antigout medicines—but to no avail. In addition, several attempts have been made to chemically dissolve the affected tissue. In 1907, Langemark tried using fibrinolysin; in 1931, Hesse used pepsin; and in 1965, Bassot used trypsin mixed with hyaluronidase. In many cases, the condition rapidly recurred, leading to general disappointment with

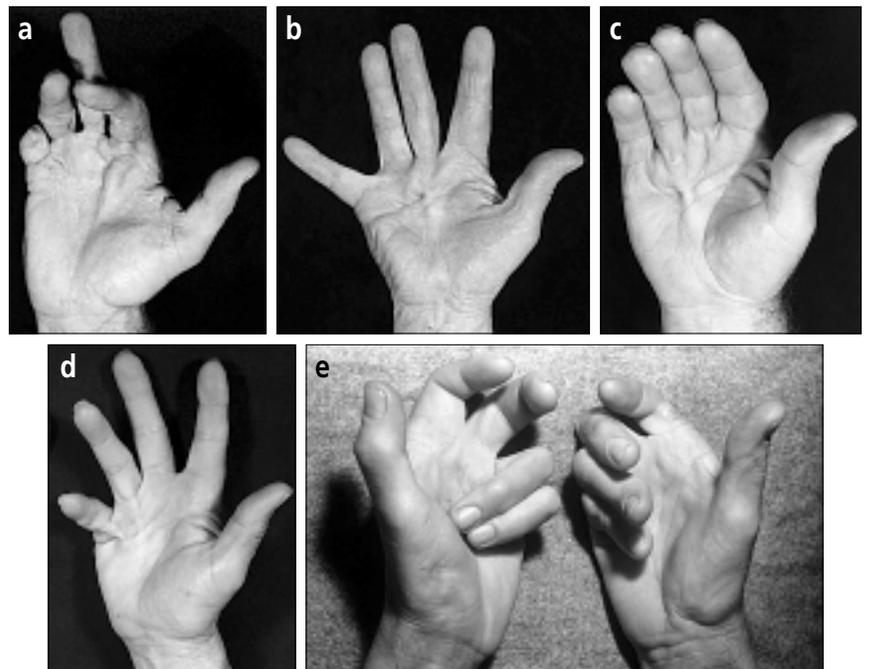


Figure 6. Involvement of various digits: (a) index finger, (b) long finger, (c) ring finger, (d) small finger, and (e) multiple digits.

this type of therapy. Hueston reports that intralesional injections of triamcinolone acetate controlled a Dupuytren's nodule in his own palm (24).

In 1981, Brickley-Parsons et al showed that the fundamental cause of the finger contractures in DD is "an active cellular process that progressively draws the distal extremities of the affected tissue closer together at the same time that the original tissue is being replaced. The result of these two processes is simply a shorter, smaller piece of tissue fabric containing collagen molecules, fibrils, and fibers of normal length and organization." The development of DD is always along anatomically identifiable connective tissue structures. This logical explanation of the mechanism, but not the cause, of the contractures gave further stimulus to the search for nonsurgical methods of contracture release (25).

In July 2000, Badalamente and Hurst reported on enzyme injection as a treatment for DD. They injected clostridial collagenase into the lesions of 29 patients. In 34 metacarpophalangeal joints, 28 corrected to 0°, and 2 corrected to 50° of normal extension with full range of motion. In 9 proximal interphalangeal joints, 4 corrected to normal and 2 to within 15° of normal. There were 2 failures. Side effects have been minimal. They concluded that the injections appeared to have merit, and further studies are planned (26).

SURGICAL TREATMENT

Dupuytren completed his first operation for contractures on June 12, 1831. General anesthesia was not introduced until 1835, so this operation and many subsequent procedures were done with assistants "immobilizing" the operative area. Some patients drank 1 to 2 bottles of wine preoperatively. History does not record how effective this was. Dupuytren's operative technique was reported as follows:

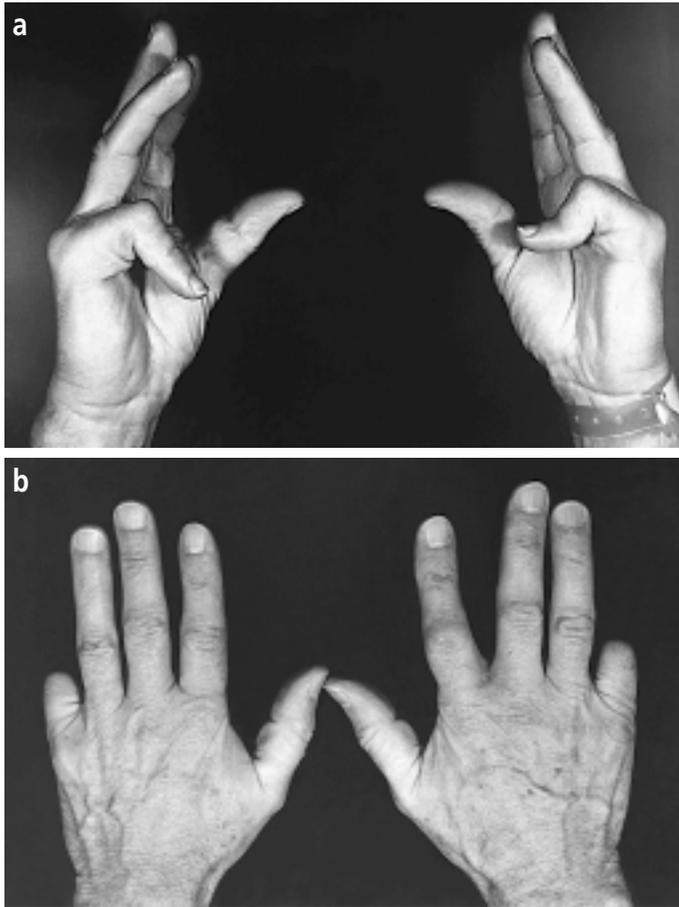


Figure 7. Severe involvement of the small finger on both hands in (a) a woman and (b) a man. The likelihood of providing full range of motion by surgery is remote. In the hardworking farmer pictured in (b), the logical treatment was amputation through the proximal interphalangeal joint. Support for power grip activities is provided by retention of the proximal phalanx.

The hand of the patient being firmly fixed, he [Dupuytren] commenced by making a transverse incision, ten lines in length [12 lines = 1"], opposite the metacarpo-phalangeal articulation of the ring-finger, the bistoury divided first the skin, then the palmar aponeurosis with a crackling noise audible to the ear. The incision completed, the ring-finger straightened, and was as easily extended as in the natural state. Wishing to spare the patient the pain of a fresh incision, Dupuytren endeavoured to extend the section of the aponeurosis by gliding the knife transversely, and deeply, under the skin towards the ulnar border of the hand to accomplish the disengagement of the little finger, but in vain; he was only able to partially extend the incision of the aponeurosis. Consequently, he determined to make a fresh transverse incision opposite the articulation of the first and second phalanges of the little finger, and thus detached its extremity from the palm of the hand, but the rest of the finger remained flexed towards this part. He then divided the skin from the aponeurosis by a fresh incision, opposite the articulation of the corresponding metacarpo-phalangeal joint. This produced a slight relaxation, but its effects were incomplete. At length a third, and last, incision was made transversely, opposite the middle of the first phalangeal joint, and the little finger was at once able to be extended with the greatest ease. This result distinctly showed that the last incision had divided the point of insertion of the aponeurotic digitation. Very little blood was lost by these incisions, and was stopped by dry charpie; the ring and little fingers were placed in extension by the aid of an appropriate instrument fixed on the back of the hand.

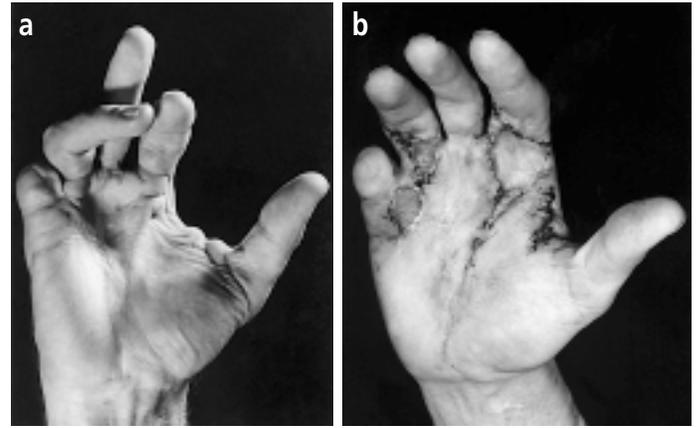


Figure 8. Dupuytren's diathesis. (a) Previously, the small finger was partially amputated, but the involvement was particularly severe in the thumb web. (b) Surgical clearance combined with excision of involved skin and full-thickness skin grafting provided a functional hand.

The postoperative course was normal for the times. On the third day, suppuration was commencing. The next day, suppuration was completely established; nevertheless, by the 20th day, cicatrization was complete.

Following this first operation, a great variety of procedures have been tried and have eventually distilled down to a relatively few useful operations. Earlier operations consisted of fasciotomies, in which the cords were cut via small skin incisions. (In 1808, Henry Cline advocated "cutting through the aponeurosis with a common knife.") This procedure was gradually replaced by fasciectomy, in which the contracting bands were excised to varying extents. The results of these 2 procedures were not long lasting, and more extensive excisions were advocated, culminating in the 1940s with the MacIndoe operation of radical excision of the palmar aponeurosis and its extensions. This was done through a lengthy transverse incision on the line of the distal palmar crease, with the palmar skin being raised as a full thickness skin graft. I was taught to do this early in my training but abandoned it fairly rapidly in favor of the Willie Sutton approach of going where the disease was present. Nowadays, the common approach is through longitudinal incisions to obtain a good view of all diseased tissue, with the line of incision being converted into Z plasties on closure.

Each digit can be solely involved, or varying combinations can occur (Figure 6). Involvement of the thumb or little finger is technically very challenging because of the fascial plane's involvement in the thumb web space and involvement of the abductor digiti minimi area of the little finger. In late disease, the digital joints' involvement in this finger can be so severe that the fingernail will grow into the palm, and amputation is the only reasonable treatment (Figure 7).

Patients with the diathesis or with multiple areas of palmar involvement are often best treated by excision of the adherent skin and underlying tissues and by covering the area with a full-thickness skin graft obtained from the inner aspect of the arm (Figure 8). This grafting does not always take completely over the irregular contours of the palm, and this failure has led to the use of the open palm method. In this, the wounds are partially sutured under no tension, and a sterile dressing is applied to the raw areas. For a reason not well understood, palmar skin is "for-

giving,” and the raw area heals well with full epithelial coverage in about a month or 6 weeks. (This healing property is not present in the skin of the dorsum of the hand.)

Whatever procedure is used, postoperative care should be entrusted to a trained hand therapist whose services are invaluable, particularly in women. For some unknown reason, the disease appears in women in a later age group, their proximal interphalangeal joints are prone to postoperative stiffness, and sympathetic dystrophy occurs more frequently in them than in men.

The decision to operate should be based on the surgeon’s experience, an intimate knowledge of the normal and abnormal neurovascular anatomy in the area, and the need for increased function. Operating in the absence of digital contracture is rarely, if ever, justified. For example, palmar nodules occasionally cause discomfort, but this does not warrant surgical excision (Figure 2). The rate of contracture is important; in younger people or those with the diathesis, it occurs more rapidly than in older patients. Two consultations 3 to 6 months apart will establish the rate of contracture, and patients will better understand the need for surgery.

While surgery can improve the contractures, it will have no beneficial effect on progression of the disease. Recurrence is often said to appear in the operative area, but in fact it is extension of the disease into areas previously unaffected that causes the “recurrence.” This has caused the use of radical clearance procedures not always justified by the state of disease or the age of the patient. I have never met a patient who was not grateful for the reassurance that he or she did not have cancer, though few admit the thought had occurred to them.

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